Major Northeastward Range Extension for a Western Grasshopper Species: New State Record for Trimerotropis pallidipennis (Burmeister) in Wisconsin

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Trimerotropis pallidipennis (Burmeister, 1838) (Orthoptera: Acrididae: Oedipodinae) is a common grasshopper species across much of the western U.S., particularly across the southwestern states, and known from every continental state west of the 100th Meridian, except perhaps the Dakotas. Outside the U.S., it is known from British Columbia, Canada, and is widespread in Mexico (Otte 1984). Within its breeding range, it is known to be of occasional economic importance and outbreaks of this species are known to occur fairly regularly (Barnes 1960, Pfadt 2002). Unlike many grasshopper species, T. pallidipennis is known to disperse for relatively long distances, and records for single individuals far outside its general breeding range are frequent (Pfadt 2002). In general, it appears these migrant individuals are most common in the western Great Plains in relatively close proximity to the regular range of this species. For example, it has been found as far east as Missouri (BugGuide 2023a; Ross 2022a, 2022b), Arkansas (bigdogvic28 2022), Kansas (Koffel 2020), and Iowa (Morehouse 2022) and apparently even once became briefly established in Hawaii in the 1960s (Pfadt 2002). Although rare in western Nebraska, it is seen there nearly every year (pers. obs.).

Northeastward Occurrence for the Western Grasshopper
Trimerotropis pallidipennis (Burmeister) (Acrididae: Oedipodinae)

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Abstract

Trimerotropis pallidipennis (Burmeister) (Orthoptera: Acrididae: Oedipodinae) mostly occurs in the southwestern U.S., but is known to migrate significant distances periodically. It appears that some individuals of this species occasionally migrate very long distances. Here, I present an extreme record for this species, over 480 km northeast of any previously known records, including any others recorded from 2022. A single male specimen was collected and photographed in Price County in north-central Wisconsin in June 2022.

Keywords: Trimerotropis pallidipennis, Wisconsin, grasshopper, migrant

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Figure 1: Recorded county-level distribution of *Trimerotropis pallidipennis* in the northern and central Great Plains and Midwestern states. Data based on from Hebard (1925), (1931); Brust et al. (2008); Brust et al. (2015); Harman et al. (2022); iNaturalist (2023); and BugGuide.net (2023b).

Figure 2: Location of capture for Wisconsin *Trimerotropis pallidipennis* specimen, around 6.5 km (4 mi) east of Fifield. The red marker indicates the actual location of collection (N 45.88697, W 90.33345). State Highway 70 is visible about 150 meters to the south. Note the predominantly forested environment around the clearing where the specimen was captured.
yellow rather than yellow, dark band diffuse, prominent pronotal crest which is cut by one sulcus. The hind tibiae are usually grayish brown to somewhat bluish. A female *C. viridifasciata* is shown in Fig. 4 for comparison.

Capture in early June largely rules out *Spharagemon bolli* Scudder, *Spharagemon collare* (Scudder), and *Spharagemon marbornata* (Harris) as all three of these species do not appear as adults in WI until at least late June (Kirk and Bomar 2005). Kirk and Bomar (2005) report adults of *S. bolli* and *S. collare* first appearing in late June, and the earliest WI record for *S. marmorata* is 1 July. Morphologically, these three species differ from the collected specimen by their more robust shape, more prominent pronotal ridge, and having the median pronotal crest cut by only one sulcus. All three of these species have red or orange present on the hind tibiae, while the specimen in question has pale yellow hind tibiae. Figure 5 shows the three WI *Spharagmon* species for comparison.

Three *Trimerotropis* species are known to occur in WI. While *Trimerotropis verruculata* (Kirby) might occur in the area that this specimen was found, adults are morphologically very different from the specimen in question. *Trimerotropis verruculata* exhibits a general dark color with markings generally indistinct or mottled, a deep and somewhat falcate hindwing with an exceptionally broad blackish band, and dark brown to blackish hind tibiae. Adults occur later in the year, with most WI records from August (Kirk and Bomar 2005).

*Trimerotropis maritima* (Harris) is generally only known from sandy beaches, sandbars, and sand barrens in WI (Kirk and Bomar 2005). Collection dates for adults in WI range from 13 July to 20 September (Kirk and Bomar 2005), much later than this specimen was found. Adult *T. maritima* also differ from this specimen in generally having diffuse markings or a slightly mottled appearance and having the blackish band on the hind wing significantly wider. In addition, *T. maritima* has orange hind tibiae, in
contrast with the pale yellowish hind tibiae of the specimen in question. Figure 6 shows *T. maritima* for comparison.

The specimen is highly unlikely to be *Trimerotropis huroniana* E. M. Walker for several reasons. *Trimerotropis huroniana* is an endangered species in WI that has only been found twice in the state. This species is limited to sandy beaches and both occurrences were in Door County along Lake Michigan. The recorded occurrence dates for *T. huroniana* in WI were 28 July and 17 August, much later than this specimen was collected. Although *T. huroniana* is morphologically similar to this specimen, it tends to be lighter in color overall and with generally poorly-defined markings (Otte 1984). I photographed this species in Door County, WI on 21 July 2023 (Fig. 7).

*Trimerotropis huroniana* species averages smaller in size than *T. pallidipennis* and has much more subdued markings.

Thus, we can rule out this specimen from any known Wisconsin band-winged grasshopper species. However, the genus *Trimerotropis* remains challenging to identify and the classification within the genus remains somewhat debated (Otte 1984). As such, there are three *Trimerotropis* species not yet known from WI that look similar to this specimen and range to within 1,600 km (1,000 mi.) of the state. These three species include *Trimerotropis diversellus* Hebard, *T. pallidipennis*, and *Trimerotropis saxatilis* McNeill.

*Trimerotropis diversellus* is morphologically similar to *T. pallidipennis* but has shorter wings in relation to the hind femur (Otte 1984). Like *T. pallidipennis*, *T. diversellus* has pale yellowish hind tibiae. This
A grasshopper can occur in open pine forest, which is similar to the habitat in which this specimen was collected. The nearest known record to WI is from western Minnesota, approximately 320 km (200mi) from the Wisconsin border. Otte (1984) reports adults of this species occurring from July to October, much later than this specimen was collected. Thus, although this specimen in question appears morphologically similar to *T. diversellus*, its forewing length to hind femur ratio appears to be noticeably greater than 2, which would be more consistent with *T. pallidipennis* than *T. diversellus*. In addition, its collection in early June would seem much too early for *T. diversellus*.

*Trimerotropis saxatilis* is very similar in appearance to *T. pallidipennis* but appears to be closely associated with rocky outcrops and is mostly limited to the southeastern U.S. (Otte 1984). In fact, Otte (1984) only shows it occurring as far west as central Oklahoma. However, in more recent years, it has been found as far west as eastern Colorado and western Nebraska (D. Ferguson, pers. comm.). It appears that some previous specimens from these areas were previously misidentified as *T. pallidipennis* (D. Ferguson, pers. comm.). While morphologically similar to *T. pallidipennis* in the western Great Plains, its wings are shorter in comparison to the hind femur and the hindwing band is typically broader (Otte 1984, D. Ferguson, pers. comm.). *Trimerotropis saxatilis* adults do not generally appear until July, and even the earliest Nebraska records are from 15 July. In addition, this grasshopper appears to be very strict in its habitat preference and is not found away from its rocky outcrop habitat. The nearest records to WI are from about 600 km (370 mi) to the south. Thus, based on seasonality, habitat, and morphology, *T. saxatilis* can likely be ruled out for the specimen in question.
Trimerotropis pallidipennis has long wings in comparison to the hind legs (2.08–2.35 ratio). In Figs. 3 and 7, it is apparent that the forewing is clearly more than 2 times the length of the hind femur. The hindwing band is comparatively thin and the hind tibiae are pale yellowish. Unlike the aforementioned Spharagemon and other Trimerotropis species, this species is thought to have more than one brood per year, and adults can be found as early as early June. As a frequent migrant, it is known to occur in a variety of habitats. I have collected it on urban sidewalks on more than one occasion.

Based on matching morphological characters, the specimen in question is most likely either T. diversellus, T. pallidipennis, or T. saxatilis. Based on its morphological characteristics, habitat occurrence, and early season occurrence, the specimen is most likely T. pallidipennis. In fact, the only two of the aforementioned species are likely to be found in the adult stage at the time this specimen was captured are C. viridifasciata and T. pallidipennis. Figure 8 shows the pinned specimen alongside a T. pallidipennis collected in Nebraska. In addition, Fig. 9 shows the lateral pronotum, and Figs. 10 and 11 show the inner and outer hind femur respectively.

This range extension clearly demonstrates the extreme dispersal ability of T. pallidipennis. While it is unclear whether the specimen arrived at the location of collection by hitchhiking on a motor vehicle or by its own flight is unknown. In any case, this distribution record is remarkable and suggests this grasshopper likely occasionally wanders further eastward in the United States than records suggest.

Literature Cited


